

MAY 10 1954

UNITED STATES DEPARTMENT OF AGRICULTURE
Agriculture Research Service
Entomology Research Branch
May 6, 1954

Postbox 85
Curacao, N. A.

To: R. C. Bushland

From: A. H. Baumhover

Subject: Weekly report - Curacao

EGG MASS COLLECTION AND FLY RELEASE DATA																		Number of males released					
Number of fertile and sterile egg masses at goat pens																		Total					
	1		2		3		4		5		6		7		8		9		10				
Date	F	S	F	S	F	S	F	S	F	S	F	S	F	S	F	S	F	S	F	S	F	S	
4/27	8	0	1	1	2	1	0	0	2	1	7	1	1	0	6	0	2	0	0	3	29	7	
	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
28	4	0	0	0	0	1	5	1	5	0	1	0	0	0	3	2	3	0	1	0	22	4	17,000
29	6	0	1	0	2	0	6	0	2	0	5	0	0	0	7	1	2	0	0	0	31	1	
30	4	0	3	2	3	0	2	0	1	0	0	0	1	0	5	0	2	1	2	2	23	5	
5/1	5	0	0	0	2	0	5	0	4	0	3	0	1	0	4	3	1	1	0	0	25	4	8,500
2	2	1	1	0	6	0	4	2	0	0	3	0	0	0	1	0	2	0	3	0	22	3	
3	1	0	3	0	5	0	2	0	1	1	2	0	0	1	0	0	1	0	2	0	17	2	
4	5	0	3	0	5	2	0	0	0	0	1	0	2	0	3	0	3	0	0	2	22	4	8,500
Total	27	1	11	2	23	3	24	3	13	1	15	0	4	1	23	6	14	2	8	4	162	23	

Percent sterility--12.4%

Receipt of your memoranda of April 23 and 28 is acknowledged.

Since I felt that increasing the number of flies released would be in line with the agreement we had reached while you were here on Curacao I did not elucidate in my report of April 20. However, we seem to be in disagreement on what is a "large proportion of sterile egg masses." My opinion that 15 or 20% sterility will not significantly reduce the Curacao population in less than 4 or 5 months is based on the data from the Captiva pen during our work there in 1953. This, admittedly, is a small area and possibly not comparable to the Curacao situation. However, the percent sterility of the total number of egg masses collected on Captiva during the 4th through 11th week was 30.6. Although there was a decline in egg masses collected during the 11th and 12th week there is no definite proof that the population was being diminished. Although the Curacao population of April 14 thru 26, e.g., was probably one-half as great as the Captiva population the 100 male release is producing only 15 to 20% sterility compared to 30.6% on Captiva.

Obviously it will be more economical to release 100 than 200 males/pq. mi./wk. for eventual eradication in Florida. However, with eradication as the goal I feel that the important decision is the most economical number that will eradicate after the population has been reduced to a non-detectable level. Undoubtedly greater numbers will be required in areas of high potential than in areas of low potential, but possibly the most economical rate to eradicate may vary from the rate initially most economical to obtain significant reductions in the population.

My impatience to increase the number of sterile males released was also influenced by the original timetable of the experiment. Over two months have passed--if we proceed through May and June without reducing the population it would leave us insufficient time in which to increase numbers and provide the answer to eradication by September 1st, which Dr. Lindquist had requested (by phone) in January 1954. I now assume that you plan for an increased stay on Curacao.

Utilizing the Trenton data on population density, 413 egg masses were collected over an 8-day period at 4 pens or an average of 12.9 masses per pen per day. If the number of egg masses collected is directly proportional to the population density each egg mass would indicate a population of 55 flies (both sexes) per square mile--708 divided by 12.9. During the latter part of April the daily egg mass average per pen was approximately 3 on Curacao, indicating a population of approximately 170 flies per square mile. Although it is difficult to evaluate the accumulative effect of the releases there has been ⁴⁰⁰⁰ ~~4000~~ significant increase in sterile masses, indicating that the 2 releases per week may be little more than maintaining an average effective ^{sterile} male population of 100 per square mile. Comparing this number with a natural male population of 85 per square mile the percent sterility expected would theoretically

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Obviously it will be more economical to release 100 than 200 males/pen. For eventual eradication in Florida. However, with eradication as the goal I feel that the important decision is the most economical number that will eradicate after the population has been reduced to a non-detectable level. Undoubtedly greater numbers will be required in areas of high potential than in areas of low potential, but possibly the most economical rate to eradicate may vary from the rate initially most economical to obtain significant reductions in the population.

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Utilizing the Trenton data on population density, 413 egg masses were collected over an 8-day period at 4 pens or an average of 12.8 masses per pen per day. If the number of egg masses collected is directly proportional to the population density each egg mass would indicate a population of 55 flies (both sexes) per square mile--708 divided by 12.8. During the latter part of April the daily egg mass average per pen was approximately 3 on Curacao, indicating a population of approximately 170 flies per square mile. Although it is difficult to evaluate the accumulative effect of the releases there has been no significant increase in sterile masses, indicating that the 2 releases per week may be little more than maintaining an average effective male population of 100 per square mile. Comparing this number with a natural male population of 25 per square mile the percent sterility expected would theoretically

be 54%. Since we have evidence to indicate that our released males may be one-third or less efficient than the natural males it appears to me that the 15 to 20% sterility obtained recently is about all we can expect under the present circumstances.

Fly shipments have been coming through fine with a few exceptions. The last 4 shipments, however, had begun to emerge before arrival, but with no noticeable increase in misshapen flies. The shipment of May 1st had 32 sacks damaged by ants and for some reason the April 28th shipment emerged only 51%. However, the bulk of the shipments are emerging at the rate of 84 to 95% with a few around 75%.

One of the shipments emerging upon arrival was 6 days old according to the pupation date. I'm wondering if there could have been an error in the date or whether the Florida temperature is making it difficult to hold the pupae at 80° F. Although I'm sure that the fellows at Orlando can borrow a little air-conditioned space at 80° F. I feel that it would be important for us in the future to have a small air-conditioned room held at 50 or 60° F., containing small, individually controlled cabinets which could be maintained at various temperatures above the room itself. This setup would be convenient for adjusting time of emergence and for conducting further tests on the effects of temperature on the pupae. If there is any money left in the budget for this project an air-conditioning unit would, in my opinion hold priority over any other need.

Commenting on Mr. Graham's experience in disrupting the larval period when additional medium is needed for the developing larvae I suggested that instead of removing the larvae from the pan, remove the old medium which the larvae have left, replacing it with fresh medium, thus allowing the larvae to migrate of their own free instinct.

I share your concern for the pressure put on Orlando to produce flies on schedule. The desire for a regular schedule of release is prompted more by the pilot's actual availability than the inconvenience of an indefinite schedule. However, the KLM schedule is made up each Thursday and if Mr. Graham would cable us in time, arrangement could be made with KLM to fly on other days than the current Tuesday and Friday schedule. I certainly think we should try to make the releases without depending on duplicate shipments of flies.

Although there has been a variation of one and one-half days in the time of emergence after the flies have arrived here it is difficult to believe that this variation is caused entirely by the variation in temperatures during shipment. Perhaps the necessity to hold the pupae at exactly the correct temperature should be emphasized (before shipment).

We will await your further decision in regard to the releases to be made.

Please give my best regards to the personnel attending the Albuquerque meeting.

cc: A. W. Lindquist
A. J. Graham
G. W. Eddy

AH Baughman

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Please give my best regards to the personnel attending the Albuquerque meeting.

A. W. Eddy

cc: A. W. Lindquist
A. J. Graham
G. W. Eddy

UNITED STATES DEPARTMENT OF AGRICULTURE
Agriculture Research Service
Entomology Research Branch
May 13, 1954

MAY 17 1954

Postbox 85
Curacao, N. A.

To: R. C. Bushland

From: A. H. Baumhover

Subject: Weekly report - Curacao

EGG MASS COLLECTION AND FLY RELEASE DATA
Number of fertile and sterile egg masses at goat pens

Number
of males
released

Date	1		2		3		4		5		6		7		8		9		10		Total	
	F	S	F	S	F	S	F	S	F	S	F	S	F	S	F	S	F	S	F	S	F	S
5/5	3	0	2	0	8	0	1	1	4	1	2	0	2	2	5	0	4	0	1	1	32	5
6	3	0	4	0	0	0	2	1	1	0	3	0	0	0	5	0	4	0	4	2	26	3
7	1	1	3	0	4	1	0	0	1	1	2	0	3	0	4	1	5	0	0	0	23	4
8	3	0	3	0	4	4	0	0	3	0	7	0	1	0	5	0	5	2	1	0	32	6
9	4	0	2	1	5	1	2	1	1	0	2	0	0	2	3	0	3	1	0	4	22	10
10	7	5	3	0	6	1	0	0	0	0	4	0	0	0	1	0	6	0	1	1	28	7
11	<u>5</u>	<u>0</u>	<u>3</u>	<u>3</u>	<u>12</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>4</u>	<u>0</u>	<u>2</u>	<u>0</u>	<u>3</u>	<u>0</u>	<u>6</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>37</u>	<u>4</u>
	26	6	20	4	39	7	6	3	11	2	24	0	8	4	26	1	33	3	7	9	200	39

sterility 16.3%

The initial shipment containing flies treated with 5000 r and 7500 r was received on May 10th and released on May 12th, with the 5000 r released on the lower and the 7500 r released on the upper ^(half) end of the island. The enclosed sketch can be superimposed on your map to indicate the boundary of the 2 areas.

In studying the past week's totals it is quite evident that at pens 4 and 7, where the total egg masses have been only 9 and 12, respectively, the percent sterility is considerably higher-33%- than at the remainder of the pens, except No. 10. This indicates to me that on the whole the individual pens are doing a fairly good job of sampling the different areas. However, at pen No. 10 (abbatoir) apparently we have been too generous with the flies we have released in the city. The only other explanation

would be a greater survival of flies released by auto. However, shortly after you left Curacao we rechecked the dropping characteristics of the release sacks after changing over to the water, sand and flour mixture for ballast, using sacks with live flies. Some of the sacks were opened and some left closed and we were able to detect no damage to the flies remaining in the sacks. Of course, flies from the opened sacks were for the most part dispersed when the sacks were recovered, so it is impossible to evaluate accurately the effects on the flies under these conditions. However, to clear the point perhaps we should attempt sometime to compare aerial release with ground release under practical conditions.

Also we could possibly place sacks of flies in small screen cylinders, releasing them from the sack into the cylinder immediately before dropping. The sack could be opened by means of a string of wire extending through the screen cylinder. Another possibility would be the use of a wind tunnel to determine the maximum velocity of air which the flies will withstand. Perhaps a wind tunnel would be available at one of the air bases at San Antonio.

Pen No. 11 was established at Westpunt on May 11th. Sketch No. 2, enclosed, can be superimposed on your map to indicate its location.

At the present time we have the services of a pilot who is available to fly almost any afternoon. This, at least temporarily, eases the situation.

Recently Mr. Graham sent us a trial shipment of eggs in anticipation of the time when we would not have sufficient egg masses for infesting our goats. However, larvae from the eggs shipped did not live well. Larvae contained in a specimen vial tightly stoppered were all dead and larvae contained in a shell vial stoppered with cotton were 80% dead. Both containers had sufficient moisture when opened. Mr. Graham did not state the age of the eggs when shipped, but I assume that they were laid shortly before being shipped. Perhaps they can try placing egg masses with a small quantity of regular screw-worm medium for shipping.

enc.

cc: A. W. Lindquist
A. J. Graham
G. W. Eddy

A. H. Baughman

MAY 17 1954

May 10, 1954

Postbox 85
Curacao, N. A.

To: A. W. Lindquist, Head, Section of Insects Affect-
Man & Animals

From: A. H. Baumhover

Subject: Photographs of Screw-worm Eradication Project

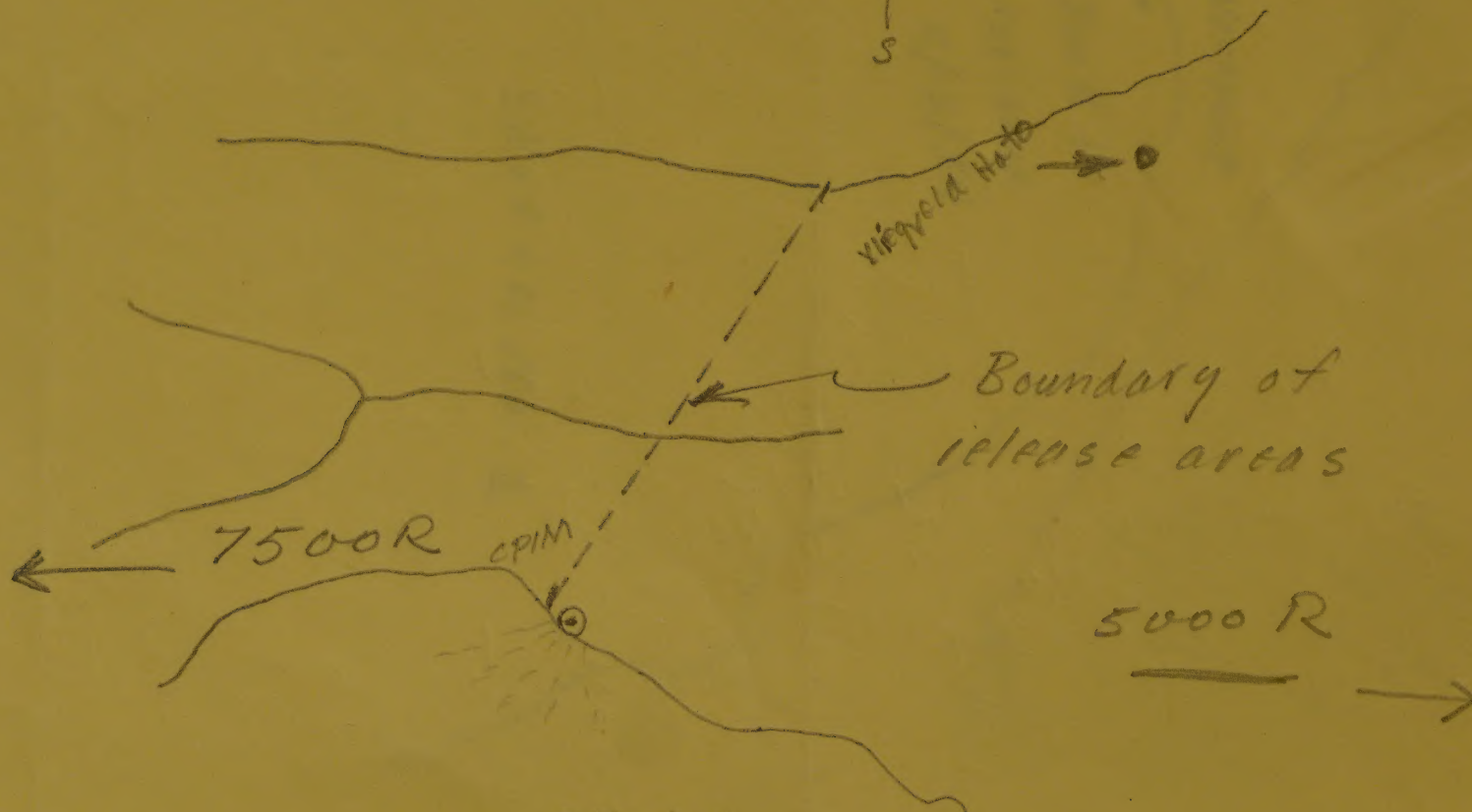
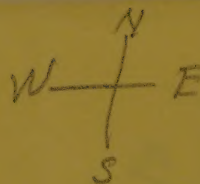
In response to your memorandum of April 26, 1954, a group of photographs was sent to you under separate cover, May 4, 1954. Within a few days I hope to print pictures of additional activities. In the meantime I would appreciate Mr. Rathbone's reaction to those sent on May 4.

My negative file, presently in Orlando, Florida, should arrive here this evening, when I will forward to you negatives of the cobalt source.

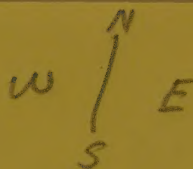
A. H. Baumhover

cc: R. C. Bushland

5/13/54



Sketch No 1



Westpant

Pen # 11

Established
5/12/54

Boca grandi

Sketch No. 2

MAY 24 1954

UNITED STATES DEPARTMENT OF AGRICULTURE
Agriculture Research Service
Entomology Research Branch
May 19, 1954

Postbox 85
Curacao, N. A.

To: R. C. Bushland

From: A. H. Baumhover

Subject: Weekly Report - Curacao

EGG MASS COLLECTION AND FLY RELEASE DATA													Number of males released
Number of fertile and sterile egg masses at goat pens													
Date	1	2	3	4	5	6	7	8	9	10	11	Total	
	F S	F S	F S	F S	F S	F S	F S	F S	F S	F S	F S	F S	F S
5/12	9 0	5 2	2 3	2 1	1 0	5 0	3 0	10 1	6 1	2 0			45 8
13	5 0	3 2	5 1	1 0	3 1	3 0	5 1	5 0	4 0	0 0	1 0		35 5
14	4 2	7 0	3 0	2 0	2 0	1 0	4 0	5 1	3 0	0 0	1 1		32 4
15	2 0	4 0	2 0	0 0	1 0	2 0	5 0	1 1	8 1	1 0	1 2		27 4
16	8 3	6 1	5 0	1 0	1 2	3 1	4 1	5 2	4 1	0 0	2 0		39 11
17	3 1	2 0	2 4	0 0	2 0	2 0	6 0	10 1	2 0	0 0	4 0		33 6
18	<u>10 1</u>	<u>2 0</u>	<u>4 0</u>	<u>3 0</u>	<u>1 0</u>	<u>3 0</u>	<u>7 0</u>	<u>4 1</u>	<u>3 0</u>	<u>1 0</u>	<u>1 2</u>		<u>39 4</u>
	41 7	29 5	23 8	9 1	11 3	19 1	34 2	40 7	30 3	4 0	10 5		250 42

Sterility 14.4%

No. of males released 17

5/12 7045

5/14 7285

5/18 8448

A. H. Baumhover

1/ 7500 r males released on upper half and 5,000 r males released on lower half of island.

MAY 24 1954

UNITED STATES DEPARTMENT OF AGRICULTURE
 Entomology Research Branch
 Agriculture Research Service
 May 19, 1954

Postbox 65
 Curacao, N. A.

To: R. C. Bushland
 From: A. H. Baumhauer
 Subject: Weekly Report - Curacao

Date	EGG MASS COLLECTION AND FLY RELEASE DATA											Total
	1	2	3	4	5	6	7	8	9	10	11	
	F	S	F	S	F	S	F	S	F	S	F	F
5/12	0	5	2	2	1	1	0	5	0	1	2	45
13	0	3	2	1	1	0	1	5	0	0	1	35
14	4	7	0	2	0	1	0	5	1	0	1	32
15	2	4	0	0	1	0	5	1	1	1	1	37
16	8	6	1	5	1	0	1	5	2	0	2	39
17	3	2	0	2	0	0	0	1	0	0	4	33
18	10	2	0	4	0	3	0	4	3	1	1	39
4/17	7	29	5	23	9	11	12	34	20	4	10	250

Sterility 4.4%

No. of males released 1/2
 5/12 7045
 5/14 7285
 5/18 8448

1/2 1500 r males released on upper half and 5,000 r males released on lower half of island.

A. H. Baumhauer

JUN 11 1954

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
ENTOMOLOGY RESEARCH BRANCH
BELTSVILLE, MARYLAND
Plant Industry Station

June 9, 1954

To: R. C. Bushland, P. O. Box 232, Kerrville, Texas

From: A. W. Lindquist, Head, Section of Insects Affecting Man
and Animals

Subject: Curacao Experiment

I showed Dr. Knipling Mr. Baumhover's report of June 2. After he had studied it we had a conference and many things were discussed but Dr. Knipling feels very strongly that a test involving the release of sterilized males only must be worked into the Curacao experiment. It was agreed, however, that we would proceed with the experiment outlined in our letter of several days ago, that is, comparing Curacao strain - fed and unfed - and the Texas strain in the same manner. If these tests do not provide worthwhile information we should consider the release of males only.

The thought just occurred to me now that males could be released on half of the island and both sexes on the other half so we would have a direct comparison. If males only are released I understand that a dosage of 2500 r would suffice and we probably would then have stronger and more avid flies. If the data that Mr. Baumhover submitted is correct, that 7500 r produced 16.6 percent sterility and 5000 r produced 26.4 percent, 2500 r might be still better with the added advantage of no competition from released females. I brought up the question of the availability of CO₂ and other facilities for sexing the flies on the island and it would be well for Mr. Baumhover to check this now and also look into the possibility of hiring one or two extra people for a month to assist in sexing the flies. We are bringing this up now so that you can be studying the matter but I feel no decision can be made until we learn the outcome of the next month's experiment. It was agreed that you had proceeded correctly on the release of both sexes.

A. W. Lindquist

cc: A. H. Baumhover
A. J. Graham

Agricultural Research Service
xx

JUN 13 1954

xx
Entomology Research Branch
P.O. Box 3391
Orlando, Fla.

June 11, 1954

To: A.W. Lindquist, Head, Section of Insects Affecting
Man and Animals

From: A.J. Graham

Subject: Screw-worm Shipments to Curacao

The June 8 shipment was sterilized at 5,000r and 7,500 r and was the last shipment of pupae to be sterilized at those dosages. I was of the opinion that the 6,000 r dosage would begin with the release of the Curacao strain, about the third week in June. I had a cablegram from Mr. Baumhover today to sterilize the pupae at 6,000 r and ship half in sacks as before and half in screen cylinders. We will make shipments of this type on June 12 and 16. There should be a shipment for June 19 but for some unknown reason the culture for that shipment(Texas Strain) was a complete loss at two days of age. On June 22 we hope to ship equal numbers of both the Curacao and Texas flies all sterilized at 6,000 r.

We had planned to begin shipping the Curacao flies about June 18 but could not get enough eggs. That first attempted egging was with flies from pupae that Mr. Baumhover had recently shipped from Curacao. The colony of Curacao flies that was started in March laid very well this time and from that egging we hope to make the first shipment on June 22. Besides the difficulty of egging in the past this strain has been more difficult to rear and the pupae have been smaller than those of the Texas strain. I do not know what difficulties there may have been in establishing colonies of the Texas and Florida strain to laboratory rearing. I assume that Dr. Bushland and Mr. Eddy did that. Last year we sent Mr. Eddy some eggs from wild flies at Trenton and I recall him stating that flies from these did not lay well.

cc; R.C. Bushland
A.H. Baumhover

A. J. Graham

APPLIED ENTOMOLOGICAL RESEARCH SERVICE
XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXX

ENTOMOLOGICAL RESEARCH BRANCH

P.O. Box 3321

Orlando, Fla.

June 11, 1954

To: A.W. Lindquist, Head, Section of Insects Affecting
Man and Animals

From: A.J. Graham

Subject: Sawfly-worm Shipments to Curacao

The June 8 shipment was sterilized at 5,000 r and was the last shipment of pupae to be sterilized at those dosages. I was of the opinion that the 5,000 r dosage would begin with the release of the Curacao strain, about the third week in June. I had a cablegram from Mr. Baumhauer today to sterilize the pupae at 5,000 r and ship half in sacks as before and half in screen cylinders. We will make shipments of this type on June 12 and 13. There should be a shipment for June 13 but for some unknown reason the culture for that shipment (Texas strain) was a complete loss at two days of age. On June 22 we hope to ship equal numbers of both the Curacao and Texas flies all sterilized at 5,000 r.

We had planned to begin shipping the Curacao flies about June 12 but could not get enough eggs. That first attempted egg was with flies from pupae that Mr. Baumhauer had recently shipped from Curacao. The colony of Curacao flies that was started in March laid very well this time and from that egg we hope to make the first shipment on June 22. Besides the difficulty of getting the pupae the past this strain has been more difficult to rear and the pupae have been smaller than those of the Texas strain. I do not know what difficulties there may have been in establishing colonies of the Texas and Florida strains to laboratory rearing. I assume that Dr. Bushland and Mr. Eddy did that. Last year we sent Mr. Eddy some eggs from wild flies at Trenton and I recall him stating that flies from these did not lay well.

cc: R.C. Bushland
A.H. Baumhauer

A. J. Graham

UNITED STATES DEPARTMENT OF AGRICULTURE
Agriculture Research Service
Entomology Research Branch

May 26, 1954

Postbox 85
Curacao, N. A.

To: R. C. Bushland

From: A. H. Baumhover

Subject: Weekly Report - Curacao

EGG MASS COLLECTION AND FLY RELEASE DATA
Number of fertile and sterile egg masses at goat pens

Date	1		2		3		4		5		6		7		8		9		10		11		Total	
	F	S	F	S	F	S	F	S	F	S	F	S	F	S	F	S	F	S	F	S	F	S	F	S
5/19	6	0	2	0	4	0	0	0	1	4	7	0	7	3	8	0	4	0	0	0	1	0	40	7
20	8	0	3	0	5	1	1	0	1	0	2	1	4	0	8	0	3	0	0	0	2	0	37	2
21	9	0	0	2	6	0	2	1	2	0	4	1	2	0	7	1	5	0	0	0	0	0	37	5
22	7	1	1	1	6	0	4	0	1	1	2	2	0	0	4	0	3	0	0	0	0	0	28	5
23	6	0	1	1	4	1	1	0	1	3	5	0	4	0	9	1	3	1	0	0	1	0	35	7
24	9	1	2	1	6	0	2	1	3	1	6	1	3	0	8	1	5	1	0	0	0	0	44	7
25	4	0	2	2	4	0	0	1	1	2	4	0	0	0	10	2	3	0	0	0	4	0	32	7
	49	2	11	7	35	2	10	3	10	11	30	5	20	3	54	5	26	2	0	0	8	0	253	40

Sterility 13.7%

No. of males released 1/

5/25 4140 5,000 r
4680 7,500 r

5/21 2480 5,000 r
2880 7,500 r

1/ 7,500 r males released on upper half and 5,000 r males released on lower half of island.

cc: A. W. Lindquist
A. J. Graham
G. W. Eddy

A. H. Baumhover

UNITED STATES DEPARTMENT OF AGRICULTURE
Agriculture Research Service
Entomology Research Branch

May 26, 1954

Postbox 85
Curaçao, N. A.

To: R. C. Bushland

From: A. H. Baumhauer

Subject: Weekly Report - Curaçao

EGG MASS COLLECTION AND FLY RELEASE DATA
Number of fertile and sterile egg masses at each pen

Date	1	2	3	4	5	6	7	8	9	10	11	Total
5/19	0	2	0	0	1	0	0	0	0	0	0	40
20	0	3	0	1	1	0	1	0	0	0	0	27
21	0	0	0	2	1	0	1	0	0	0	0	27
22	1	1	0	0	1	1	0	0	0	0	0	28
23	0	1	1	1	1	0	0	0	0	0	0	25
24	1	1	0	1	1	0	0	0	0	0	0	44
25	0	2	0	0	1	0	0	0	0	0	0	32
49	2	11	2	10	10	10	20	24	26	0	0	223

Sterility 13.7%

No. of males released 1/

2480 5,000 r

2880 7,500 r

2480 5,000 r

2880 7,500 r

1/ 7,500 r males released on upper half and 5,000 r males released on lower half of island.

cc: A. W. Lindquist
A. J. Graham
G. W. B. day